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**METHOD FOR INSPECTING ELECTRODEPOSITION STATE OF ABRASIVE  
GRANULES**

[Toryuu Denchaku Jotai Kensa Hoho]

Hatanaka, Koji and Mori, Kazuo

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Inventor : Hatanaka, Koji and Mori, Kazuo

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(71) Applicant: Honda Motor Co., Ltd.

2-1-1 Minami-Aoyama, Minato-ku, Tokyo

(72) Inventor: Hatanaka, Koji

Honda Engineering Co., Ltd.

1-10-1 Shin-Sayama, Sayama City, Saitama

Prefecture

(72) Inventor: Mori, Kazuo

Honda Engineering Co., Ltd.

1-10-1 Shin-Sayama, Sayama City, Saitama

Prefecture

(74) Agent: Chiba, Takehiro, Patent Attorney (with one other)

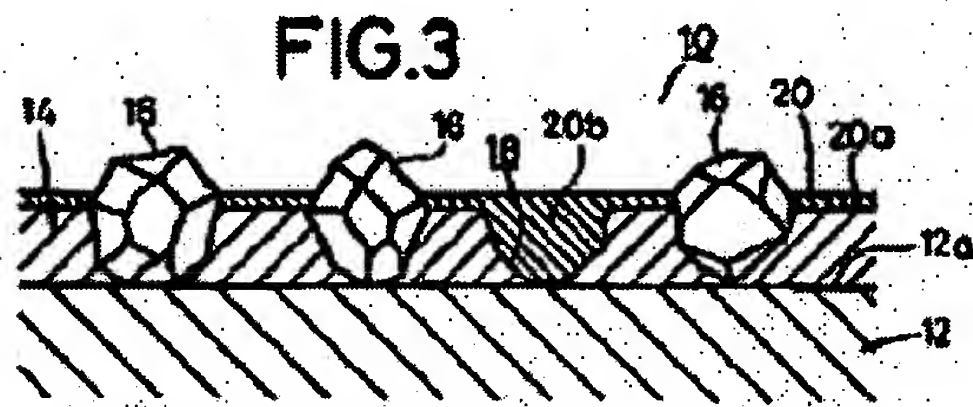
(54) Title of Invention: METHOD FOR INSPECTING  
ELECTRODEPOSITION CONDITION OF ABRASIVE GRANULES

(57) Abstract:

Purpose: To make it possible in a simple step to accurately determine the presence or absence of shed abrasive granules and to inspect the distribution state of the abrasive granules efficiently and with high accuracy.

Constitution: A prescribed period of time after a mixed solution is substantially uniformly applied to the grinding surface of a grinding stone 10, the volatile solute

evaporates naturally and a particle layer 20 is formed on the grinding surface. The layer 20 is formed on the surface of a plated layer 14 and recessed sections 18 and only the tips of the abrasive granules protrude outward from the layer 20. Therefore, an inspection for the presence or absence of the abrasive granules 16 can be carried out easily with high accuracy, because dispersion of light by the plated layer 14 and the recessed sections 18 is prevented.



2

#### CLAIMS

[Claim(s)]

[Claim 1] In a grinding stone on which a grinding and abrasive surface is formed by electrodepositing abrasive granules on a metallic surface of a grinding stone base, a method for inspecting the electrodeposition condition of said abrasive granules to inspect the electrodeposition state of said abrasive granules which is characterized in that it comprises a process wherein a mixed solution of a powdered material and a volatile solvent is applied to said grinding and abrasive surface and a process wherein, after the volatile solvent in said mixed solution has evaporated and a powder layer has been formed, the electrodeposition state of said abrasive granules is inspected.

[Claim 2] The method for inspecting the electrodeposition state of said abrasive granules according to Claim 1 which is characterized in that said powdered material is calcium carbonate or a ceramic powder and said volatile solvent is an alcohol.

#### DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to a method of inspecting the electrodeposition condition of abrasive granules on a grinding stone on which the abrasive granules have been electrodeposited on a metallic surface on a grinding stone shaft.

[0002]

[Description of the Prior Art] Generally, the electroplated grinding wheel which combined superhard abrasive granules, such as a diamond and CBN, on the surface of grinding wheel base metal by electroplating is widely adopted as a tool for grinding.

[0003] It is necessary to inspect the electrodeposition condition of said abrasive granules, especially the distribution condition of said abrasive granules immediately after electrodeposition processing of the abrasive granules, and the operator usually carries out by the visual inspection of this kind of grinding stone using a microscope. The inspection of the distribution condition of these abrasive granules comprises (1) whether the number of the abrasive granules within a predetermined surface area (for example, 1 cm<sup>2</sup>) is a predetermined number and (2) whether the spacing of the abrasive granules within the predetermined surface area is uniform. The quality of a grinding stone is judged by these results.

[0004] Moreover, a visual inspection like the above is conducted when a grinding stone is actually used for a grinding activity after only predetermined time, in order to check the omission condition of an abrasive granules.

[0005]

[Problem(s) to be Solved by the Invention] However, in the above-mentioned visual inspection, scattered reflection occurs in an abrasive granules and a plating side by the illumination light, and also it has the color which this abrasive granules and a plating side, for example, a nickel-plating side, approximated. For this reason, the distinction activity of said abrasive granules will become fairly difficult.

[0006] When an abrasive granules is omitted by being especially used for a grinding activity actually, although the crevice corresponding to these remains of omission is formed in a plated layer, the crevice side serves as a polygon of the same configuration as an abrasive granules surface. For this reason, the crevice side which is the remains of omission reflects the illumination light irregularly, and the problem that existence of an abrasive granules cannot be distinguished to accuracy is pointed out.

[0007] This invention can solve this kind of problem, can judge the existence of an abrasive granules, and omission to accuracy at an easy process, and aims at offering the efficient abrasive granules electrodeposition condition inspection method which can be inspected to high degree of accuracy for the distribution condition of this abrasive

granules.

[0008]

[Means for Solving the Problem] In the grinding stone with which, as for this invention, the abrasive granules was electrodeposited by a metallic surface on a grinding stone shaft, and grinding and abrasive surface was formed in order to attain the aforementioned object It is the abrasive granules electrodeposition condition inspection method for inspecting the electrodeposition condition of said abrasive granules, and after the process which applies the mixed solution of a powder object and volatile solvent to said grinding and abrasive surface, and this volatile solvent in said mixed solvent volatilize and a powder layer is formed, it is characterized by having the process which inspects the electrodeposition condition of said abrasive granules.

[0009] Moreover, said powder object is the minute powder of a calcium carbonate or the ceramics, and it is desirable that said volatile solvent is alcohol.

[0010]

[Function] By the abrasive granules electrodeposition condition inspection method concerning the above-mentioned invention, after the mixed solution of a powder object and volatile solvent is applied to grinding and abrasive surface of a grinding stone, natural volatilization of this volatile solvent is carried out. For this reason, a powder layer with a powder object can be formed in the crevice side which are a plated layer surface and the remains of abrasive granules omission, only an abrasive granules can project from said powder layer, and this abrasive granules can be viewed to easy and accuracy.

[0011] Furthermore, a white powder layer will be prepared as a powder object is the minute powder of a calcium carbonate or the ceramics, and the visual activity of an abrasive granules is carried out more easily. Moreover, it becomes possible to color a powder layer a desired color, and speeding up and increasing the precision of this visual activity are attained by setting said powder layer as the arbitrary color corresponding to the color of a plated layer, etc. And while carrying out natural evaporation to volatile solvent being alcohol easily and workability's being good, viscosity is low and a powder layer does not cover the head of an abrasive granules.

[0012]

[Example] An example is given about the abrasive granules electrodeposition condition inspection method concerning this invention, and it explains below with reference to an

attached drawing.

[0013] In Fig. 1 and Fig. 2, the reference figure 10 shows the grinding stone with which the abrasive granules electrodeposition condition inspection method concerning this example is enforced. A grinding stone 10 is equipped with grinding wheel base metal 12, the plated layer 14 of the nickel formed in surface 12a of this grinding wheel base metal 12, and two or more abrasive granules 16 that fix to surface 12a of said grinding wheel base metal 12 by this plated layer 14.

[0014] As for this grinding stone 10, the crevice 18 only whose predetermined time is the remains of omission by which it was used for the grinding activity in and the abrasive granules 16 was selectively omitted in the plated layer 14 is formed actually.

[0015] Next, the abrasive granules electrodeposition condition inspection method concerning this example is explained using the above-mentioned grinding stone 10.

[0016] First, the mixed solution of a powder object and volatile solvent is prepared. As this powder object, the minute powder of a calcium carbonate or the ceramics is used. This is because it is white, and it is easy to attach contrast and can moreover be easily colored a desired color, while fine powdering is easy.

3

[0017] Alcohol, for example, industrial alcohol, is used as volatile solvent. This is because a powder object condenses in a low location in the case of evaporation, viscosity is still lower, so said powder object does not cover to the head of an abrasive granules 16 while workability is good since evaporation time amount is rapid.

[0018] Then, a mixed solution is applied to an abbreviation average at grinding and abrasive surface (surface in which the abrasive granules 16 is formed) of a grinding stone 10. In this case, the surface of an abrasive granules 16 is smooth, and since the abrasive granules 16 of a parenthesis projects outside from the plated layer 14, a mixed solution does not adhere to the head side of said abrasive granules 16. Therefore, after predetermined time progress, volatile solvent carries out natural evaporation and the powder layer 20 is formed in grinding and abrasive surface (refer to Fig. 3 and Fig. 4). In that case, the powder layer 20 has light-gage layer 20a prepared in the flat part of a plated layer 14, and heavy-gage layer 20b which enters in a crevice 18, as shown in Fig. 3.

[0019] Subsequently, the omission condition of the



abrasive granules 16 in a grinding stone 10 is checked by the visual inspection. In this case, according to viewing, light-gage layer 20a is checked by thin white, and heavy-gage layer 20b is checked by dark white. And since the powder layer 20 is not formed in the head side of an abrasive granules 16, it can be outside exposed of said abrasive granules 16 from said powder layer 20, and it can inspect the existence of this abrasive granules 16 easily and certainly.

[0020] If this is explained concretely, when the powder layer 20 is not formed, as shown in Fig. 2, the abrasive granules 16 and the crevice 18 will be intermingled in grinding and abrasive surface, the illumination light will reflect irregularly on the field of this abrasive granules 16 and a crevice 18, and distinction with this abrasive granules 16 and a crevice 18 will be difficult.

[0021] However, in this example, since the powder layer 20 is formed on grinding and abrasive surface, as shown in Fig. 4, heavy-gage layer 20b is prepared in a crevice 18, and this crevice 18 is checked by looking by dark white. Therefore, it cannot reflect irregularly in a crevice 18, the existence of an abrasive granules 16 can be detected to high degree of accuracy, and the effectiveness of becoming possible to check the omission condition of this abrasive granules 16 efficiently is acquired. Moreover, since light-gage layer 20a is prepared in the flat part of a plated layer 14 and this plated layer 14 is checked by looking by thin white, the scattered reflection in this plated layer 14 can be prevented effectively, and there is an advantage that the dependability of an existence judging of an abrasive granules 16 improves further.

[0022] By the way, the visual inspection immediately after manufacturing a grinding stone 10 by electrodeposition processing is the same as that of the inspection routine mentioned above, and is roughly explained below with reference to Fig. 5.

[0023] That is, a mixed solution is applied to an abbreviation average at grinding and abrasive surface of a grinding stone 10, volatile solvent carries out natural evaporation after predetermined time progress, and the powder layer 30 is formed in grinding and abrasive surface. This powder layer 30 is formed on the plated layer 14, and only the head side of an abrasive granules 16 projects outside from said powder layer 30.

[0024] Then, the quality judging of a grinding stone 10 is performed by checking the number and distribution condition of an abrasive granules 16 in predetermined area (part



surrounded with the alternate long and short dash line among Fig. 5). Since only the abrasive granules 16 projects outside from the powder layer 30 in that case, this abrasive granules 16 can be checked by looking easily and certainly, and the effectiveness that the quality judging activity of this grinding stone 10 is carried out by high degree of accuracy is acquired.

[0025] In addition, although this example explained using the white powder object, it is not limited to this and said powder object can be set as the arbitrary color corresponding to the color of a plated layer 14, etc. (coloring). This enables it to do a visual activity on high degree of accuracy further.

[0026]

[Effect of the Invention] According to the abrasive granules electrodeposition condition inspection method concerning this invention, the following effectiveness thru/or advantages is acquired.

[0027] Since natural volatilization of this volatile solvent is carried out after the mixed solution of a powder object and volatile solvent is applied to grinding and abrasive surface of a grinding stone, a powder layer with a powder object can be formed in a plated layer surface and the crevice side by abrasive granules omission, only an abrasive granules can project from said powder layer, and this abrasive granules can be viewed to easy and accuracy.

[0028] Furthermore, a white powder layer will be prepared as a powder object is the minute powder of a calcium carbonate or the ceramics, and the visual activity of an abrasive granules is carried out more easily. Moreover, it becomes possible to color a powder layer a desired color, and speeding up and increasing the precision of this visual activity are attained by setting said powder layer as the arbitrary color corresponding to the color of a plated layer, etc. And while carrying out natural evaporation to volatile solvent being alcohol easily and workability's being good, since viscosity is low, a powder layer cannot cover the head of an abrasive granules and the existence judging of said abrasive granules can be carried out efficiently.

## DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

Fig. 1. explanatory view of a vertical section of a grinding stone after the activity to which the abrasive granules electrodeposition condition inspection method is applied in the example of this invention.

Fig. 2. top view of said grinding stone.

Fig. 3. explanatory view of a vertical section of a part of condition that the powder layer was formed in said grinding stone.

Fig. 4. top view of a part of condition that the powder layer was formed in said grinding stone.

Fig. 5. top view of the grinding stone immediately after the electrodeposition to which the abrasive granules electrodeposition condition inspection method is applied in the example of this invention.

[Legend]

10 -- Grinding stone	12 -- Grinding wheel base metal
14 -- Plating layer	16 -- Abrasive granules
18 -- Crevice	20 30 -- Powder layer

4

Fig. 1

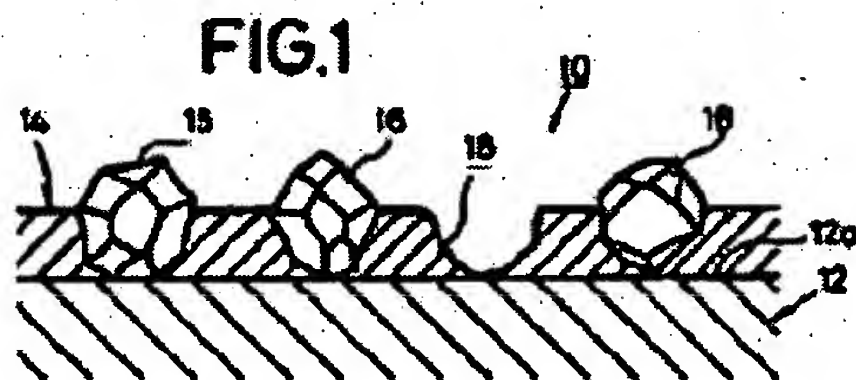


Fig. 2

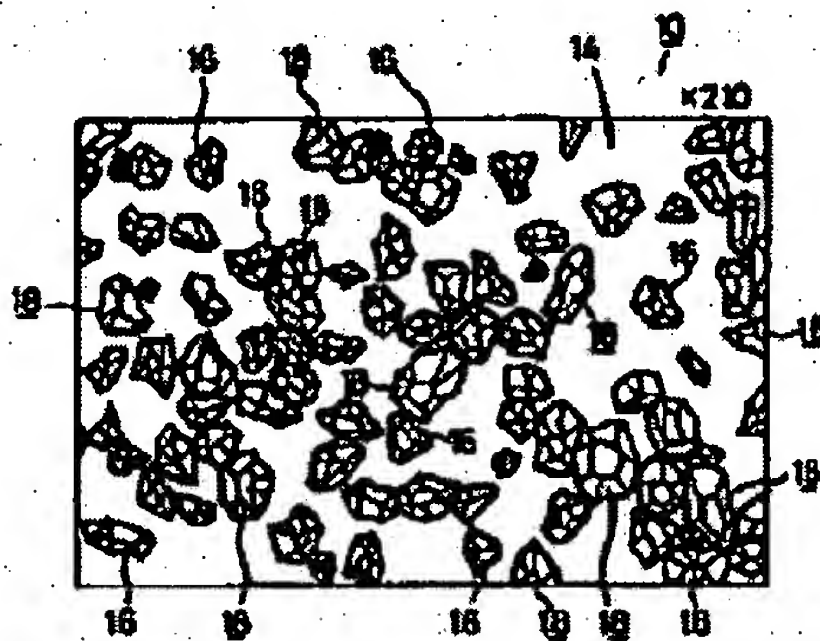


Fig. 3

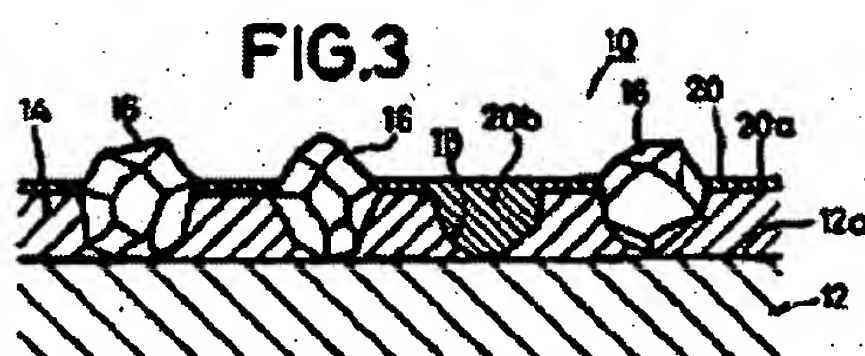


Fig. 4

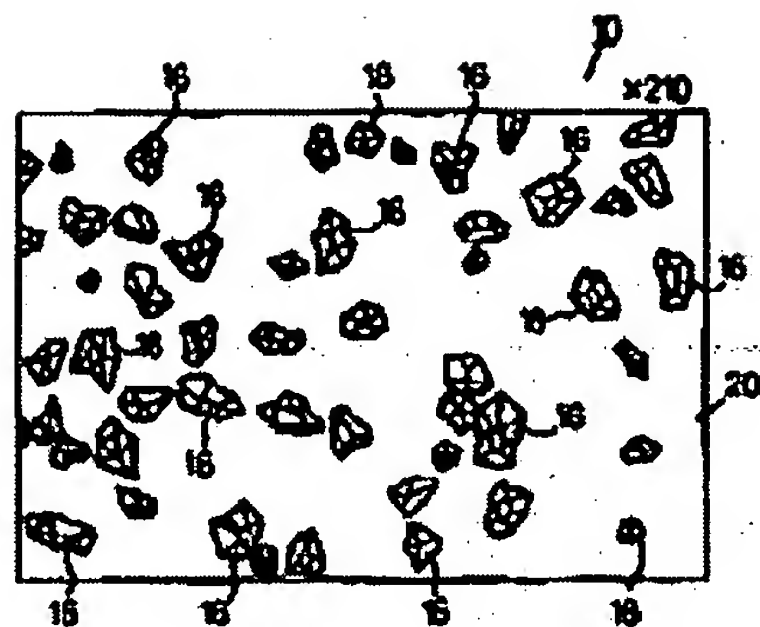


Fig. 5

